DOCUMENT RESUME

ED 142 199 IR 005 051

AUTHOR	Hicks, Bruce
TITLE	MSEA--The Microcomputer System for Educational Applications.
INSTITUTION	Illinois Univ., Urbana. Dept. of Secondary Education.
REPORT NO	ISEAC-20
PUB DATE	77
NOTE	27p.; The Illinois Series on Educational Applications of Computers ; Best copy available
EDRS PRICE	MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS	*College Programs; *Computer Oriented Programs; Educational Facilities; Educational History; Educational Resources; *Program Development; Schools of Education

ABSTRACT

The Department of Secondary Education in the College of Education at the University of Illinois has been involved in the educational application of computers for nearly ten years. This report documents past and future activities (i.e., programs, emphasis, concerns) and structure (i.e., staffing, equipment, funding) within the Department. Appendices list 24 publications in the "Illinois Series on Educational Applications of Computers," products of the Department, and indicate the costs of various components of micrccomputer systems. (DAG)

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Number 20

The Illinois Series on

Educational Applications of Computers

MSEA- The Microcomputer System for Educational Applications

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Bruce Hicks

February 1977

Department of Secondary Education

College of Education

University of Illinois

Urbana, Illinois

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IR005057

ISEAC Number 20

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MSEA- The Microcomputer System for Educational Applications*

Bruce Hicks

Introduction.

Earlier Reports in the Illinois Series have discussed a range of topics concerned with the educational applications of computers, such topics as computers for the whole school, maxicalculators, computer uses for elders and computer assisted management of learning and of the administration of educational computer facilities. Our conception and implementation of MSEA, the Microcomputer System for Educational Applications have developed in parallel with the preparation of the Reports in the Series, and interaction between the series and the development of MSEA have been mutually beneficial.** To a large extent, MSEA has become the focus for the activities in educational applications of computers in the Department of Secondary Education.

There has been, in the past ten years, a continuous if not steady growth in the educational applications of computers in the United States. About 60% of the secondary schools now use computers in instruction or administration.[1] Part of the interest in educational applications here in the College of Education is represented by the 100 or so "lessons" in the education "Router" on the PLATO system, 60% of which were prepared or are used largely by the Department of Secondary Education. Table 1 shows the variety of instructional and administrative programs that the Department has been using on the DEC 10 computer (page 2).

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* This Report is based on a Faculty Colloquium in the Department of Secondary Education presented on December 3, 1976.

** The many references in this report to ISEAC Reports indicates the close relation between ISEAC and MSEA.

TABLE 1
SECONDARY EDUCATION DEC10 PROGRAMS

AREA	PROGRAM	DESCRIPTION	STATUS -- *	
ADMINISTRATIVE				
ADMINISTRATIVE	INFO	INFORMATION STORAGE AND RETRIEVAL	WORKING	3PF/MIN 5DF/R/DT
ADMINISTRATIVE	SDFS	SCHOOL DIST. FINANCE SIMULATION	WORKING	R/DT
ADMINISTRATIVE	SESAMS	GRADUATE RECORDS MODEL	WORKING	DT
ADMINISTRATIVE	TSDS	TEACHING STAFF DISTRIBUTION SIMULATION	WORKING	R/DT
BIOLOGY				
BIOLOGY	GENE	INHERITANCE OF GENETIC TRAITS	WORKING	R/DT
BIOLOGY	LOCKEY	LOCK AND KEY ENZYME ACTION MODEL	WORKING	R/DT
BIOLOGY	MALAR	MALARIA CONTROL SIMULATION	WORKING	R/DT
BIOLOGY	POP	GYPSY MOTH POPULATION GROWTH SIMULATION	WORKING	R/DT
BIOLOGY	STERL	INSECT CONTROL SIMULATION	WORKING	R/DT
BIOLOGY	TAG	SAMPLING EXERCISE - SIMULATED FARM POND	WORKING	R/DT
CMI				
CMI	BASMS	BASIC STUDY MANAGEMENT SYSTEM	LISTING ONLY	3PF/4DF
CMI	CAISP	COMPUTER AIDED INDIVIDUALIZED STUDY	DEVELOPMENTAL-WORKING	3PF/MIN 4DF/R/DT
CONSUMER ED.				
CONSUMER ED.	BANK	BANK TRANSACTION SIMULATION	WORKING	R/DT
CONSUMER ED.	BUSDAY	BUSINESS DAY CLASS PROGRAM	WORKING	5DF/DT
CONSUMER ED.	TUTOR	SHORT FORM INCOME TAX TUTORIAL LESSON	WORKING-NOT COMPLETE	11PF/12DF/DT
CUE				
CUE	FOOD	FOOD FOR THOUGHT PROGRAM	UNCERTAIN	2PF/1DF/R/DT
CUE	HANDS	USE OF DETAIL: POETRY GENERATING	WORKING	R/DT
CUE	RECIPE	NUTRITION PROGRAM	WORKING-NOT COMPLETE	R/DT
ECOLOGY				
ECOLOGY	ECOGAM	PLANET MANAGEMENT GAME	WORKING	3PF/3DF/DT
ECOLOGY	POLUT	WATER POLLUTION SIMULATION	WORKING	R/DT
ENGLISH				
ENGLISH	CLOZE	CLOZE READABILITY CALCULATION	FORTRAN LISTING ONLY	
ENGLISH	LIBCAT	TUTORIAL LESSON - CARD CATALOGS	WORKING	2DF/R/DT
ENGLISH	POETRY	COMPUTER GENERATED RANDOM POETRY	WORKING	2PF/4DF/R/DT
ENGLISH	SPELL	SPELLING ALGORITHM	???	3PF/1DF
GAMES				
GAMES	BJ	BLACKJACK	WORKING	R/DT
GAMES	ECOGAM	PLANET MANAGEMENT GAME	WORKING	3PF/3DF/DT
GAMES	GUESS	NUMBER GUESSING GAME	WORKING	R/DT
GAMES	HANG	'HANGMAN' WORD FINDING GAME	WORKING	1DF/R/DT
GAMES	LAFIV4	LOST AND FORGOTTEN ISLAND	WORKING	3PF/1DF/R/DT
GAMES	RICH	MOO -- COWS AND BULLS GAME	WORKING	R/DT
MANAGEMENT				
MANAGEMENT	FILEM	DATA FILE MANIPULATION	WORKING	R/DT
MANAGEMENT	ROUTER	PROGRAM ROUTER	WORKING	MIN 1DF/R/DT
MATH				
MATH	INTRO & MLTDV	BEGINNING DECIMAL LESSONS	WORKING	8PF/R/DT
MATH	PLOT	FUNCTION PLOTTER	WORKING	R/DT
MATH	SAP	SURVEY ANALYSIS PROGRAM	WORKING	R/DT
MATH	TABLE	BEGINNING FRACTION LESSONS	WORKING	7PF/2DF/R/DT
MISCELLANEOUS				
MISCELLANEOUS	COMBN3	COMPUTER OMBUDSMAN	WORKING	DT
MISCELLANEOUS	DIGLH1	DIGRAPH CALCULATIONS	WORKING	2PF/DT
MISCELLANEOUS	FOOD	FOOD FOR THOUGHT PROGRAM	UNCERTAIN	2PF/1DF/R/DT
MISCELLANEOUS	HANDS		WORKING	R/DT
MISCELLANEOUS	RECIPE	NUTRITION PROGRAM	WORKING-NOT COMPLETE	R/DT
MISCELLANEOUS	SEASON	INFORMATION ON BIRD MIGRATION	WORKING	R/DT
MISCELLANEOUS	SEC	COMPUTER SECURITY SIMULATION LESSON	WORKING	3PF/R/DT
PHYSICS				
PHYSICS	CHARGE	MILLIKAN OIL DROP EXPERIMENT	WORKING	R/DT
PHYSICS	SLITS	YOUNG'S DOUBLE SLIT EXPERIMENT	WORKING	R/DT
PROGRAMMING				
PROGRAMMING	BASIC	BASIC LANGUAGE LESSONS	DEVELOPMENTAL-WORKING	7PF/R/DT
PROGRAMMING	ELBAS1	BASIC TRAINING MODEL	LISTING ONLY	
SOCIAL STUDIES				
SOCIAL STUDIES	ECOGAM	PLANET MANAGEMENT GAME	WORKING	3PF/3DF/DT
SOCIAL STUDIES	ELECT	PRESIDENTIAL ELECTIONS & ELECTORATE	WORKING	3PF/R/DT
SOCIAL STUDIES	MALAR	MALARIA CONTROL SIMULATION	WORKING	R/DT
SOCIAL STUDIES	MARKET	2 COMPANIES IN ONE PRODUCT COMPETITION	WORKING	R/DT
SOCIAL STUDIES	POLIC2	NATIONAL POLICY FORMULATION SIMULATION	WORKING	R/DT
SOCIAL STUDIES	POLSYS	CITY GOVERNMENT POLICY	WORKING	R/DT
SOCIAL STUDIES	SAP	SURVEY ANALYSIS PROGRAM	WORKING	R/DT
SOCIAL STUDIES	USPOP	U.S. POPULATION DYNAMICS STUDY	WORKING	R/DT
SPANISH				
SPANISH	OBJS & DIRO	DRILL & PRACTICE ON OBJECTS/DIRECT OBJS	WORKING	2PF/R/DT
TEACHER EDUCATION				
TEACHER EDUCATION	IAC	FLANDERS INTERACTION ANALYSIS	WORKING	DT
ZZ				
ZZ *				

ZZ * - KEY FOR 'STATUS' : PF - # PROGRAM FILES / DF - # DATA FILES / R - ROUTER / DT - ON DECTAPE

Because this Department has supported teaching and graduate studies in educational applications of computers for nearly a decade, it has taken the lead in this area, both in the College and nationally.

Breadth of interest in the Department is an important aspect of this position of leadership and is worth recording in some detail. The support of Ian Westbury and previous chairmen of the Department has been essential. Members of the staff, and some of their graduate students, in each field have contributed through comments and active participation to the development of educational applications of computers here. An incomplete list would include John Erickson (English Education--reading--PLATO*); Roger Brown (Science Education--environmental studies--PLATO and DEC 10); Kenneth Travers (Mathematics Education-instructional games, workshops--IBM 360/75, DEC 10, PLATO); and Larry Matcalf and Roland Payette (Social Science Education--simulations--DEC 10 and PLATO). Ken Travers helped to initiate instructional applications of computers in the Department in 1967. Dick Dennis's coming to the Department has more than doubled the breadth and depth of our activities in educational applications of computers. He also is the PLATO Account Director for the College.

The present author co-authored the first text[2] on CAI, with Steve Hunka of the University of Alberta, in 1972. Hunka influenced developments here in other ways, one of them being the designation of consulting assistants in EAC, which we instituted in Fall 1975. Mark Pelczarski, the first consulting assistant, and his successor, Viktors Muiznieks, have clearly demonstrated the double value of this concept: to the Department staff and students, and as a strong contribution to the professional experience of the assistants themselves.

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* English Education is the field, reading is the area studied in that field and PLATO is the computer facility used. The same format is used for other data in parentheses.

I hope that this brief review goes some way toward illustrating the importance and value of Department-vide interest and involvement (Including sharp criticism!) in the educational applications of computers. Without this interest and involvement, and its focus in the future on MSEA, there would be no strong reason to support educational applications of computers in the Department. Those building educational computer resources in the schools can make a similar statement: use and criticism of computers in education by staff and students must extend beyond one department or one group of students or "the administration only", if educational applications of computers in that school are to possess permanent value to the school.

Before turning to more detailed historical matters, I want to refer to several papers that represent part of the development of my thinking about educational applications of computers. The first[3] was written when, under the stimulating influence of Steve Hunka, I began to consider the possibly good and bad effects of CAI on students. The second paper[4] is the framework for my present concerns in the field of EAC.* The third[5] is an excellent paper by Theodore Sterling. I have reproduced the key table from his paper as Table 2 (page 5). These papers go a small part of the way toward establishing the concern that all of us should have that computers become humanized, in education as elsewhere, and of course it is we and other users who must do the humanizing, whether of the Cadillac of CAI systems (PLATO) or the VW (MESA)!

We now turn to the history of the computer systems and languages that have been available to the Department, and then to the main course, MSEA itself.

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* We use EAC, IAC and AAC to stand for educational instructional and administrative application of computers and regard IAC and AAC as two components of EAC.

Table 2. Stanley House criteria for humanizing information systems.*

A. Procedures for dealing with users

1. The language of a system should be easy to understand.
2. Transactions with a system should be courteous.
3. A system should be quick to react.
4. A system should respond quickly to users (if it is unable to resolve its intended procedure).
5. A system should relieve the users of unnecessary chores.
6. A system should provide for human information interface.
7. A system should include provisions for corrections.
8. Management should be held responsible for mismanagement.

B. Procedures for dealing with exceptions

1. A system should recognize as much as possible that it deals with different classes of individuals.
2. A system should recognize that special conditions might occur that could require special actions by it.
3. A system must allow for alternatives in input and processing.
4. A system should give individuals choices on how to deal with it.
5. A procedure must exist to override the system.

C. Action of the system with respect to information

1. There should be provisions to permit individuals to inspect information about themselves.
2. There should be provisions to correct errors.
3. There should be provisions for evaluating information stored in the system.
4. There should be provisions for individuals to add information that they consider important.
5. It should be made known in general what information is stored in systems and what use will be made of that information.

D. The problem of privacy

1. In the design of a system all procedures should be evaluated with respect to both privacy and humanization requirements.
2. The decision to merge information from different files and systems should never occur automatically. Whenever information from one file is made available to another file, it should be examined first for its implications for privacy and humanization.

E. Guidelines for system design having a bearing on ethics

1. A system should not trick or deceive.
2. A system should assist participants and users and not manipulate them.
3. A system should not eliminate opportunities for employment without a careful examination of consequences to other available jobs.
4. System designers should not participate in the creation or maintenance of secret data banks.
5. A system should treat with consideration all individuals who come in contact with it.

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* From Reference 3.

We will not in this Report describe the manifold educational applications of NSEA. It suffices to say that we expect that NSEA will be able to perform effectively and efficiently, all of the instructional and administrative services for one to four users that are now provided by manipulators and minicomputers, and because of new features of NSEA, will surpass these older computer facilities in several respects.

History of Departmental Computer Facilities

Among the computer facilities that have been available to the Department are the batch calculations provided by the Computer Services Office (CSO). This service has been maintained at a high level of efficiency by CSO for several decades and will undoubtedly continue in the future. In comparison even with smaller institutions, the support accorded time-sharing facilities at the University of Illinois has been less than enthusiastic, but both the support and use of time-sharing on this campus is growing steadily. CSO established a remote job entry office (with its complement of key punches, printers, terminals, operators and consultants) in Commerce West some years ago, a site particularly convenient for students and staff in the College of Education who want to use CSO facilities.

Various computer facilities have been made available in the College of Education itself. An IBM 1130 (with key punches and line printer) was leased for a few years. (The $30,000 per year spent on this system seems in hindsight like an excessive amount compared to the $17,000 we expect to pay *in toto* for the more versatile NSEA!). Later, several time-sharing terminals were maintained in the College, primarily for use with the very powerful language APL. After this language was removed from the CSO computer system (the IBM 360/75)

the Department leased its own teletype terminal using the BASIC language* and more recently bought the Infoton VISTAR terminal and an acounstic coupler for students and staff using BASIC in the time-sharing mode of the CSO DEC 10 computer.**

Five PLATO IV terminals were obtained for general use by the College in 1972 and have been used continuously since then in Room 10. PLATO is the largest, most highly developed CAI system in the world. It was developed and is supported by the Computer-Based Education Research Laboratory, a separate unit from CSO. It should be remarked again that the principal users of PLATO and the time-sharing facilities in the College have been students and staff in the Department, both in the student mode and in the author mode.

In 1975 the author, with the help of co-editors Bill Goddard and Dick Dennis, established the Illinois Series on Educational Applications of Computers. (See Appendices A and B.) This Series has supplied a means of disseminating EAC analysis and information to our colleagues in the universities and schools and as a target for graduate students as they strive to prepare original and well-written papers.

The status of EAC here is summarized in Figure 1.

It would appear that the Department had been reasonably busy and productive in the field of educational applications of computers, using what CSO and CERL provided together with our own single terminal. Why was it necessary to design and acquire our own microcomputer facility? Although we had been leaders in the use of PLATO and time-sharing terminals in teaching about

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* Each time-sharing system supplies, in addition to a programming language like BASIC, other facilities like editors, a repertoire of system commands etc..

** Time sharing will be provided by CSO soley on the CDC CYBER 175 computer after March 1977.

educational applications of computers and in some computer-based lesson development and research, we felt that it was now time to lead the way in designing and using, for teaching, research and service, a new, micro-computer-based system, a system that would, unlike other computer facilities possess the virtues of portability, adaptability, low cost, modern design and suitability for wide-ranging uses in the schools and in the community.* We therefore moved to MSEA which will be described in the succeeding sections.

MSEA

Development and General Characteristics. The Department began planning for its own small computer system in 1974. The author and Dick Dennis have been primarily responsible for the choice of the MSEA and the computers requested earlier, but we have received help along the way from Bob Burnham (formerly Associate Dean of the College of Education), Paul Thurston (Department of Administrative, Continuing and Higher Education), Cliff Carter (CSO), Stan Steinkamp (CSO and Department of Economics), Dominic Skaperdas (CERL) and several students in our EAC classes in the Department. Zoltan Ujhelyi (College of Education) has helped with instrumentation and video equipment. The advice of Bob Albrecht at Peoples Computer Company, as well as their publications were also most helpful in leading us to appreciate the advantages of micro-computers over maxicalculators for our purposes in EAC.

In 1974-75 we prepared several requests for University support of the purchase of a maxicalculator and its peripherals. (The four makes of maxi-calculators were described in References 10 and 11.) After his pioneering and successful experience with minicomputers for high schools, Bill Goddard in the Vancouver schools had found that the Hewlett-Packard 9830 maxicalculator served well in providing "computers for the whole school."

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* See, for example, References 4, 6, 7, 8, 9.

Although these proposals did not lead to funding the purchase of the maxicalculator system, the proposals were strongly supported by the Department and College, and they helped us to refine and strengthen our specification of just what characteristics we needed to require in a small computer system for the Department and its EAC activities. In the Spring of 1976 we decided that these requirements could best be satisfied by an appropriately chosen microcomputer system. Full funding ($14,000 for purchase of hardware and software) was obtained from the College and the University. We also found a key man, Vince Guarna, to be responsible for the technical aspects of choosing, assembling, modifying and testing all of the hardware and the system software. Without his assistance MSEA would still be a paper dream today.

What are the general characteristics of MSEA that distinguish it from other systems for EAC? MSEA is a decentralized rather than a centralized EAC facility. Although it will be able to "talk" to other computers, it will be used primarily as a "stand alone", local computer in its own right. There will be some maintenance and modification costs (which we expect will be minimal) but there will be no charges to the Department for computer time (as occur in our use of time-sharing systems), and, except when MSEA does "talk" to another computer, no telephone line charges (and these promise in the near future to become the dominant cost in time-sharing). MSEA and its peripherals* will be rugged and portable, as is necessary for our use of it in various sites in the College and in the community and the schools, in research, teaching and service.

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* Peripheral is computer argot for auxiliary equipment, like printers and displays, that allow communication in both directions between users or storage devices and the computer.

MSEA is based on up-to-date technology. Its modular construction, using printed circuit boards for its solid state memory and its interfaces to peripherals, makes possible construction from kits and later easy modification to keep pace with new advances in technology. This modularity also leads to considerable savings now and in the future in the purchase and up-dating of the hardware.

As a computing device, MSEA will be powerful and flexible. Its hardware and software will perform almost any task, for instructional or administrative applications of computers in education, that large computers can perform, except "number-crunching" (rapid, highly accurate calculations) and very rapid transfer of and access to large amounts of data. Initially MSEA will support the BASIC language and an assembly language, as well as operating systems, editors, etc. It is expected that other standard languages will be added later, like FORTRAN, ALGOL or APL, together with CAISP, a system developed here by Pelczarski for programming-free-lesson-writing that is written in BASIC.

It is noteworthy that Vince Guarna, our MSEA engineer, is an undergraduate engineering student who was in Dick Dennis' Sec Ed 317 (CAI) class. While we may not be able to find another Guarna, we do expect, on the basis of many years experience in the Sec Ed 317 classes, that we will be able to find other students who can assist the Department in maintaining and up-dating MSEA while they are studying EAC with us.

MSEA-1. Three figures will show the names and functions of the principal components of MSEA.* Figure 1 shows these components for MSEA-1, the version

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* The cost of buying or assembling many of the components of MSEA, and the relative quality of components from different manufacturers, are changing from month to month. We are, therefore, not giving in this short paper, the sources or detailed specifications of the components.

of MSEA that was demonstrated at the Faculty Colloquium.

MSEA-2. When a number of components have been added, each of which is expected to be in service by March 1, 1977, we will have MSEA-2, which is illustrated in Figure 3.

MSEA-3. The only considerable disappointment in procuring and assembling the parts of MSEA has been in the floppy disc system that we ordered from IMSAI, the company that supplied the "mainframe" and many of the printed circuit boards. The first IMSAI disc system is not acceptable and will be returned. It wil be replaced early in 1977 by a more reliable system. At that time we will have made the additions to MSEA-2 that convert it to MSEA-3, which is illustrated in Figure 4.

Courseware. One of the potential advantages of instructional applications of computers has not been realized, the seeming advantage that it would be easy to duplicate and distribute effective instructional computer programs. One reason for the failure is technical: there is too little compatibility among languages and systems. The more important reason is education-based: there is inadequate documentation both of the characteristics and the uses of each instructional program, and there is inadequate understanding of what each teacher and student user can derive from that program. (This second difficulty is examined in Reference 12.)

In using MSEA we will bear in mind the second difficulty and devote serious effort to overcoming it. The first difficulty can be resolved more directly. We expect to develop means for convenient transfer between MSEA and other educational computer systems of data and programs, and also means for making each set of data or program acceptable to the host machine. Many detailed differences between versions of BASIC must then still be resolved "by hand",

but MSEA will provide considerable assistance for this part of the data and program transfers.

Standing one and two steps behind coursevare are two types of BASIC programs that can be implemented on MSEA: CAISP (Computer Assisted Individualized Study Package), (see References 13 and 14) and INFO (a package of data base management programs - see References 15 and 16). CAISP makes it easy for the teacher (or student!) to develop certain kinds of coursevare. INFO makes it easy for the teacher or administrator (or student!) to design and use data bases.

In Conclusion.

My own experience with MSEA-1 will illustrate the remarks I will make in closing this discussion.

In the space of a few hours, on and off the system, I was able to renew my understanding of an assembly language, and prepare programs that would demonstrate a few of the virtues of direct student-computer interaction in aesthetic education, in particular, in music and art. In accordance with the Goddard principles of "computers for the whole school" I felt that I was being served in the way I needed, because of MSEA's power and adaptability and because I could get help from a number of staff and students associated with the Department, help in computer operation, in management of EAC,* in programming, in aesthetic education or in many other areas.

That is just the feeling we wish to evoke in each staff member and student in Secondary Education (and, for systems derived from MSEA for the schools, for students and staff in the schools). MSEA and its users can make it

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* See References 17 and 18.

possible for each of us to "do his thing" in educational applications of computers, whether in teaching, research, administration or service.

Appendix A.

September 1975
revised July 1976

Department of Secondary Education
College of Education
University of Illinois (Urbana)

PROSPECTUS FOR THE ILLINOIS SERIES ON EDUCATIONAL APPLICATIONS OF COMPUTERS

The department of Secondary Education has been involved in instructional applications of computers since 1969 when the course "Computer-Assisted Instruction" (now Se Ed 317) was started. This was the first such course taught by a major university in the United States, and it has prepared some 400 students in CAI since then. Other courses, "The Computer and Mathematics Education", "Computers for the Whole School" and "Teacher Education in Instructional Applications of Computers" have been added. Several of the courses express the Department's growing emphasis on computers for the whole school and for the whole community, and were strongly influenced by the work of Wm. P. Goddard in British Columbia.

In 1976, the Department initiated a new undergraduate minor in Instructional Applications of Computers. This preservice program is designed to accompany the conventional teaching majors and will provide participants professional concentration concerning "teaching with computers".

The students and staff in the Department, in their classes and research, have made steadily increasing use of a number of the computer facilities available at various times since 1969: an IBM 1130 in the College; terminals on the PLORTS and DEC 10 time-sharing systems; batch calculations on the IBM 360/75; and terminals on the PLATO III and IV CAI systems.

In the past five years the Department has actively pursued cooperative programs of teacher training with schools in the State, and particularly with Township High School District No. 214. These outreach activities now include cooperative training and development in educational applications of computers in the schools. We have chosen a microcomputer-based system as the small system for the Department that will give us a strong basis for our on-campus training in educational applications of computers and for demonstrations, consulting and training off-campus. It is small computers that Goddard has used so successfully in implementing repeatedly his philosophy of computers for the whole school.

As we looked ahead toward the growth of computer-related activities in the Department and in the schools and communities we saw the need to initiate a new series of publications, which we called the Illinois Series on Educational Applications of Computers. We visualize that this Series will satisfy the needs both to disseminate current information and analysis concerning educational applications of computers and also to support cooperative development and exchange of computer-based lessons and experience among the schools, in the communities and with the Department. In the Series we seek a balance between instructional and administrative applications of computers, the two aspects of educational applications. We also try to improve and simplify the means for assisting students, teachers and administrators to make the best use of computers and to increase our own understanding of the role of the Department in making these improvements.

We expect that staff and graduate students in the Department and staff in the schools will prepare individual papers in the Series and that the papers will be distributed initially to the school districts we work with now, and more widely at a later time.

Initially the Series has emphasized computers for the whole school. It focuses attention upon the applications of small and medium sized computers in secondary schools and in our Department. Fast batch operations, using mark sense cards, are of special interest but not to the exclusion of the more expensive, time-sharing mode of computer use. Later the Series should also consider the relative usefulness in various circumstances of smaller and larger computers (including PLATO) for the schools and the possibility of extending coverage of the Series outside Illinois and to elementary schools, junior high schools and community colleges. We would expect that the facts and principles we develop and the experience we record in the Series will, indeed, possess some validity and applicability outside the Department and of the secondary schools in Illinois.

The papers planned for the Series fall into five major areas concerning educational applications of computers, namely: specific examples of instructional and administrative applications of computers; the capabilities and cost of microcomputers, maxicalculators and other computer facilities in providing educational applications of computers; management and implementation details; philosophy and evaluation of "computers for the whole school"; and large special areas of interest in the educational applications.

Many topics or titles have been suggested by our staff and our colleagues in the Department and the schools. The ISEAC papers that have been published or are in preparation are listed on the attached sheet.

Bruce Hicks
Editor

Wm. P. Goddard
Associate Editor

J. Richard Dennis
Associate Editor

BH:jb
Enc.
SE-936

January, 1977

Department of Secondary Education
College of Education
University of Illinois (Urbana)

PUBLICATIONS

The Illinois Series on Educational Applications of Computers

Publication Date	Number	Report
3/75	1	Applications of Computers in the Whole School-Five Examples. Goddard and Hicks
2/75	2	A Study of Computer Simulations for Environmental Science Education. Dirks, Singletary and Hicks
8/75	3	Students: Where the Action Is! Hicks and Goddard
3/76	4	The Use of Computers for Instructional Purposes - A Preliminary Survey of Selected Secondary Schools in Illinois. Berryman, Doring and O-Rourke
4/76	5	Maxicalculators for the Whole School. Doring and Hicks
4/76	6	A Detailed Comparison of Maxicalculators. Doring and Hicks
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9/76	8	Elders, Students and Computers: Background Information. Jaycox and Hicks
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11/76	13	INFOSH - A BASIC Program for File Search. Muiznieks
10/76	14	Low-Budget Computer Programming in Your School. Dennis and Thomson

Publication Date	Number	Report
12/76*	15	SEC - A Simulation of Computer Privacy and Security Problems. Zielinski and Hicks
1/77	16	Lost and Forgotten Island - A Cooperation Game. Taylor
2/77	17	Spelling Judgers - A Must for Many Interactive Instructional Programs. Dennis and Brockus
2/77*	18	Computer Simulations for Pre-Service Training of Teachers. Dennis and Gaede
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3/77*	20	MSEA - A Microcomputer System for Educational Applications. Hicks
2/77*	21	Procurement Policies for CAI Systems. Muiznieks
---	22	Computer Literacy before High School. Rosen
---	23	Student Operated Documentation and Index. Rhodes
12/76	Unnumbered	How to Write a CAISP Unit. Pelczarski

Reference

1R. Computer Outreach. Hicks. Fall 1976 issue of "Computers and Society," 7, No. 3; 10-14.

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*Tentative publication date.

SE-950
2/8/77JJ

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2. Hicks, Bruce L. and Hunka, S. M., "The Teacher and the Computer", W. B. Saunders, New York (1972).

3. Hicks, Bruce L., "Will the Computer Kill Education?", The Educational Forum, March, 1970, pp. 307-312.

4. Hicks, Bruce L., "Computer Outreach", Computers and Society, Fall, 1976, pp. 10-14. (References omitted in this paper are to be published in the Winter Issue.)

5. Sterling, Theodore D., "Humanizing Computerized Information Systems", Science, Vol. 190, No. 4220, 19 Dec. 1975, pp. 1168-1172.

The Illinois Series on Educational Applications of Computers (ISEAC)

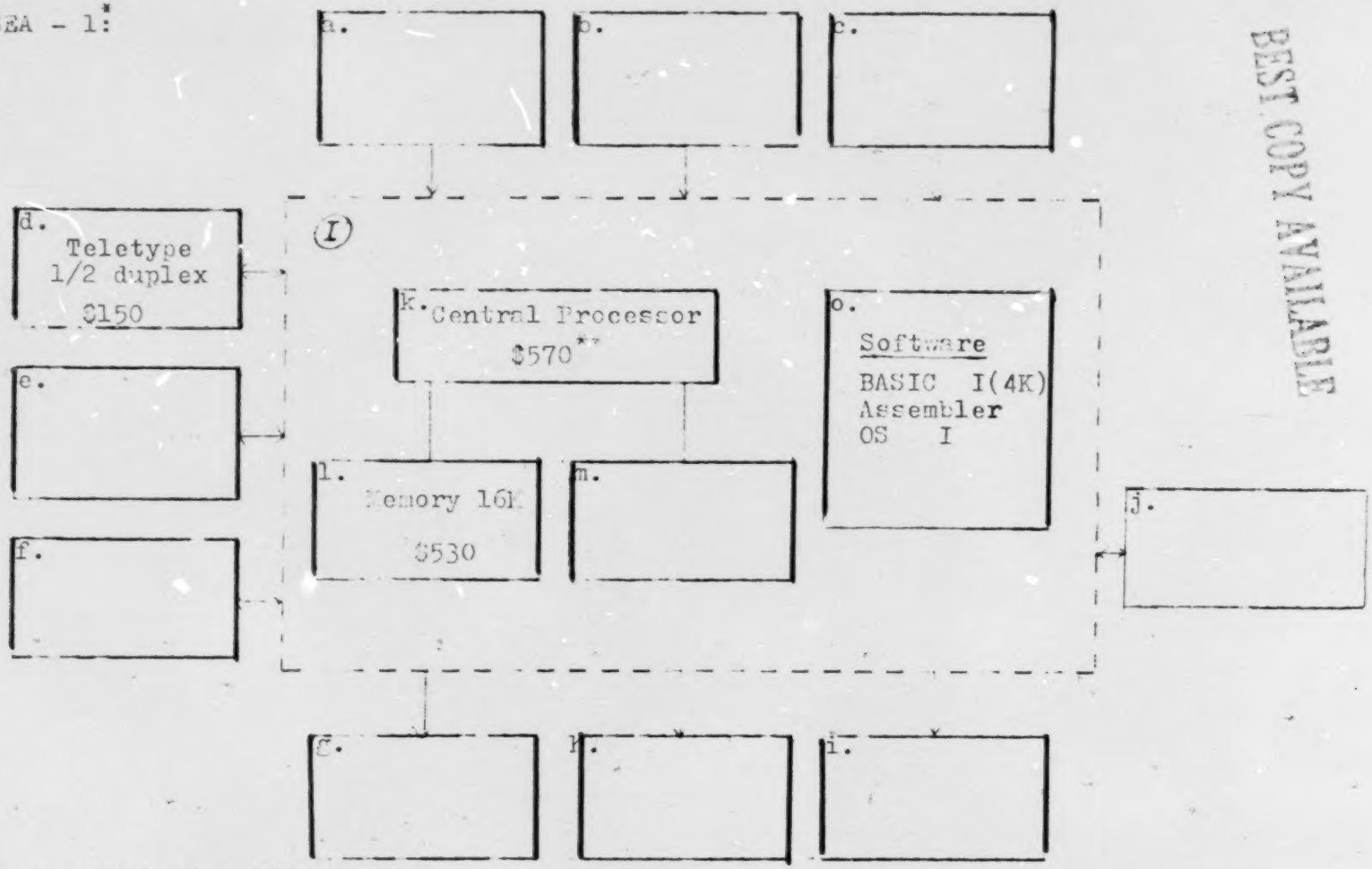
These References are li ted in Appendix B.

6. ISEAC No. 1. 7. ISEAC No. 3. 8. ISEAC No. 7. 9. ISEAC No. 8.
10. ISEAC No. 5. 11. ISEAC No. 6. 12. ISEAC No. 2. 13. ISEAC No. 11.
14. ISEAC No. 12. 15. ISEAC No. 9. 16. ISEAC No. 13. 17. ISEAC No. 10.
18. ISEAC No. 21.

Figure 2

A Microcomputer System:

MSEA - 1*:



*: The dollars and hours given are the totals for the items listed for MSEA - 1.

**: Additional initial costs: ($400) tools, equipments, mother board, cables, edge connectors, etc.

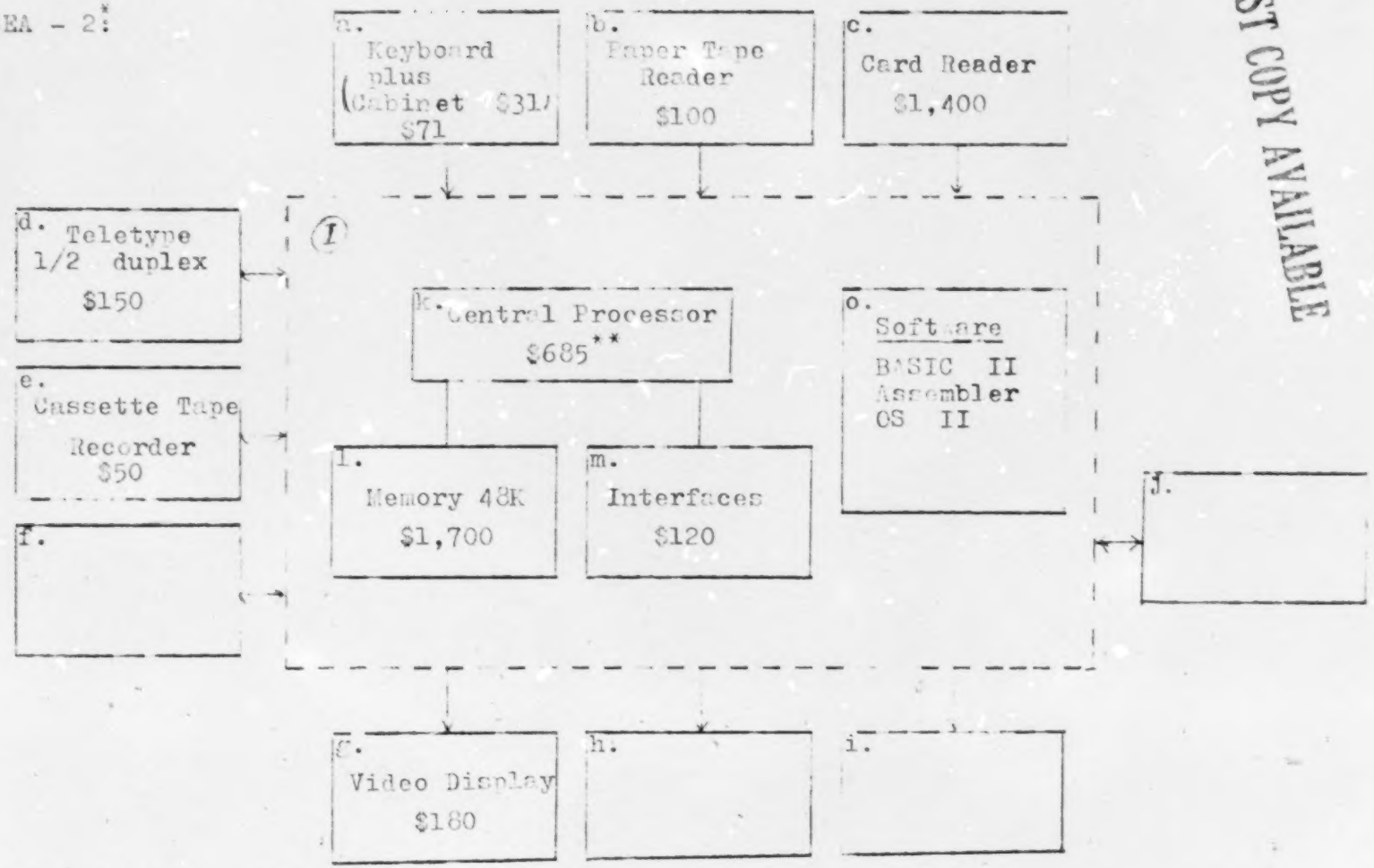
Peripherals	$ 150
Items in Box I	1,500
Engineering Assistant(200hrs.)	900
	$2,550

BEST COPY AVAILABLE

Figure 3

A Microcomputer System:

MSBA - 2*:



*: The dollars and hours given are the totals for the items listed for MSBA - 2.

**: Additional initial costs: ($400) tools, equipments, mother board, cables, edge connectors, etc.

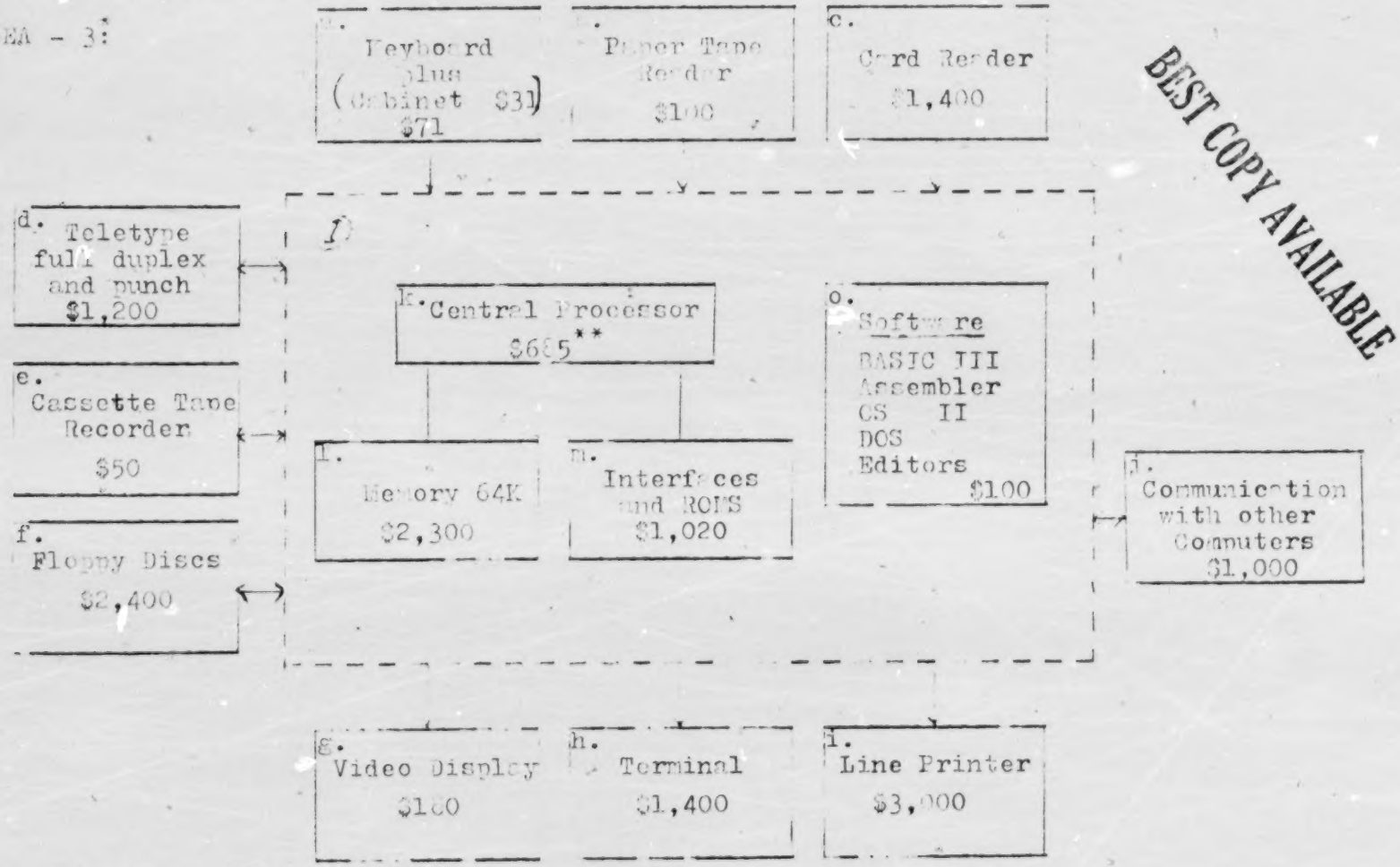
Peri herals	$1.951
Items in Box I	2,905
Engineering Assistant(340hrs.)	1,440
	$6.296

BEST COPY AVAILABLE

Figure 4

A Microcomputer System:

MSBA - 3:



BEST COPY AVAILABLE

*: The dollars and hours given are the totals for the items listed for MSBA - 3.

**: Additional initial costs: ($400) tools, equipments, mother board, cables, edge connectors, etc.

Peripherals	$10,721
Items in Box I	4,105
Engineering Assistant(540hrs.)	2,200
	$17,026